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EXAMINER	
CHUNG, JI YONG DAVID	
ART UNIT	**PAPER NUMBER**
2143	

DATE MAILED: 01/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/077,966	NAKAMURA ET AL.	
	Examiner	Art Unit	
	Ji-Yong D. Chung	2143	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *9/27/2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Remarks

1. Applicant's arguments and amendments filed on October 12, 2005 have been carefully considered, but they are deemed moot in light of new ground of rejection.

One argument Applicant has made in the Remarks applies to the instant Office Action. Applicant states that the patent to Blumenau (cited in the prior Office Action) does not show a claimed limitation, "generating an interrupt by an external storage system to a management server."

For storage area network (SAN), in which a storage system communicates through a network (e.g., network fabric), a storage system always causes the generation of an communication interrupt in the lowest hardware layer in the host server, whenever the storage system communicates with the server. The network interface card, due to the arrival of communication packets, when it needs to be serviced, generates an interrupt to the kernel.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. **Claims 1-8, 12-14, 18, and 20-22** are rejected under 35 U.S.C. 102(e) as being anticipated by Axberg et al (Pat. No. US 6,253,240, Axberg hereinafter)

With respect to **claim 1**, Axberg shows a *method of a data storage system in which multiple external storage systems that store information are connected to a first network and each of them is arranged separately, comprising* [See Fig. 1 for multiple external storage systems. Each is arranged separately and connected to a network. The disk storage attached to the host]:

generating an interrupt by an external storage system to a management server [The devices communicate with the central manager through local agents, which collect information about the attached disks. See from lines 10-26, column 3. Information from the disks is communicated to the central manager (by the local agent) relayed by the local agent. Again, see lines 10-26, column 3. The communication generates a communication interrupt, by default; it is inherent within network interfaces. Axberg also mentions "interrupt" as being generated by a network daemon, which is part of the agent];

issuing an exclusive control command by said management server to said external storage system [See lines 29-40, column 14. Commands ("control commands") maybe issued by the central manager ("management server:"). See from line 43, column 16 to line 10, column 8 for the list of commands. Local agents serve as the intermediary for executing the commands against the attached storage. See Fig. 10 and lines 11-20, column 19];

receiving by said management server, configuration information from said external storage systems in response to said command [See lines 29-40, column 14 and see lines 43-65, column 19. RAID ("storage") conveys the desired information ("configuration information") to

the central manager, through the local agent on host to which the RAID is connected. See lines 47-51, column 19]; *and*

storing in a database at said management server said configuration information that said management server received [See lines 45-50 of column 13, which indicates that collected information can be stored in a file ("database")].

Claim 2 includes only a subset of limitations of claim 1. The reasons for the rejection of claim 1 apply to claim 2.

With respect to **claim 3**, Axberg shows the method of the data storage system according to claim 2, *wherein said management server acquires configuration information of said all external storage systems in point of time series and stores it in the database managed by said management server using said exclusive control command* [See lines 28-30, column 14. The central manager obtains information ("in point of time series," which is understood as anytime). See also lines 22-29, column 14. The passage indicates that the local agent provides information to the manager in response to a command from the manager periodically].

With respect to **claim 4**, Axberg shows *the control method of the data storage system according to claim 3, wherein a time series acquisition is made with a simultaneous and periodic inquiry into multiple external storage systems as moments.* See the preceding discussion of claim 3. The command is issued periodically. See lines 28-30, column 14.

With respect to **claim 5**, Axberg shows claim 5 limitations that correspond to a number of limitations in claim 1. The following two limitations have not been discussed with respect to claim 1.

multiple computers that use information [See Fig. 1. Note that local agents reside on hosts ("multiple computers"), which are shown in Fig. 2];

logging on to a management server to request access permission. [See lines 26-29, column 7, and lines 19-23, column, for the operating systems on which the management server is installed. In either case, the operating systems require logging on to the management server for gaining access. In other words, logging on feature is inherent in the servers that are mentioned in the cited paragraphs.]

Other limitations have been substantively discussed with respect to claim 1.

With respect to **claim 6**, Axberg shows the method of the data storage system according to claim 5, *wherein said management server acquires configuration information of said all external storage systems and stores it in the database managed by said management server using said exclusive control command.* [See lines 29-40, column 14 and see lines 43-65, column 19. RAID conveys the desired information ("configuration information") to the central manager ("management server"), through the local agents on the host to which the RAID is connected. See lines 47-51, column 19]

[See lines 45-50 of column 13, which indicates that collected information can be stored in a file ("database")].

With respect to **claim 7**, Axberg shows the method of the data storage system according to **claim 5**, further comprising:

activating application programs of said multiple computers based on said exclusive control command issued by said management server [See lines 31-42, column 19. Local library ("application programs") is activated upon receiving calls from the central manager]; and

receiving by said management server, host logical configuration information from said multiple computers [See lines 41-65, column 19. Information is provided and sent to (and thus received by) the central manager ("management server"). See lines 62-67, column 16 for the information about the host. See from line 1 column 15 to line 42, column 16 for the commands that apply to the hosts ("multiple computers."].

With respect to **claim 8**, Axberg shows *the method according to claim 7, wherein said configuration information stored in said database and said host logical configuration information are associated and stored in a database.* Configuration information is sent to the central server and, in one embodiment, is stored in a file. See lines 46-56, column 13. Note that the pieces of configuration information from execution commands __GetAttr and __ListResources are "associated" in the sense that, information from __GetAttr is for each resource in the list returned by __ListResources.

Claim 12 incorporates the limitations of claims 1 and 8. The reasons for the rejection of claims 1 and 8 apply to claim 12.

Claim 13 substantively incorporates one of the limitations of claim 1, and therefore, part of the reasons for the rejection of claim 1 applies to claim 13.

Claim 14 substantively reflects the limitations of claim 3, and therefore, the reasons for the rejection of claim 3 apply to claim 14.

With respect to **claim 18**, Axberg shows *a data storage system in which multiple external storage systems that store information are connected to a network and each of them is arranged separately* [See the above discussion of claim 1], *each external storage system has an external connection interface that sends event information in order to* define or *refer to its own configuration* [Each of the storage has interface (or some means) to send information], show performance and data or post a fault, *comprising*:

a management server part as its part, which is connected to said external storage system [See the above discussion of claim 1 for the central manager]; and

a configuration information database that accumulates event information of said multiple external storage systems via said external connection interface in point of time series [See the above discussion of a file ("database") to store the configuration information at the central manager].

With respect to **claim 20**, Axberg shows *a data storage system in which multiple computers those use information and multiple external storage systems those store information*

are connected to a network respectively and each of them is arranged separately [See the above discussion of claims 1 and 5]

each computer installs an application for acquiring its own host logical configuration information [In the Axberg's system, each host computer has API's that support the commands from the central manager, as explained in the above discussion. It is inherent in the computer system that the computer installed the API's], *each external storage system has an external connection interface that sends event information in order to define or refer to its own configuration* [Each storage has ability to send ("define") configuration information back to local agent, as discussed above with respect to claim 1], to show performance and data, or to post a fault, comprising:

a management server part as its part [The central manager of Axberg is the "management server". See the above discussion of claim 1]; and

a configuration information database [See the above discussion of claim 1];

wherein the part is connected to said external storage systems [See Fig. 1] and *accumulates event information of said multiple external storage systems via said external connection interface into said configuration information database* [The central manager periodically polls the local agent (as discussed with reference with one of the claims above) and obtains ("accumulates") information ("event information") about the storage systems ("multiple external storage"). In an embodiment, these are saved into a file ("database")], and *the part is connected to said computers* [In Fig. 1, note how the central manager 110 is connected to a host 111 ("said computers")] and *accumulates host logical configuration information of said multiple computers via said network* [As discussed with respect to claim 5, the multiple computers give

configuration information to the central manager. Collected information is stored in a file], *in point of time series* [This limitation is understood as a point in time, which means just an instance].

With respect to **claim 21**, Axberg shows *the data storage system according to claim 20, wherein said management server part makes said event information of said multiple external storage systems and said host logical configuration information correspond to each other when they are accumulated in said configuration information database in point of time series*. Central manager issues commands LL__GetAttr (which queries the storage devices) and LL__ListResources (which queries the host). The commands correspond to each other, in the sense that, information from __GetAttr corresponds to each resource in the list returned by __ListResources.

With respect to **claim 22**, Axberg shows *the data storage system according to claim 21, wherein said management server comprises a function of retrieving said configuration information database by specifying a file and time information those said computers handle*. See the discussion above for claim 1. The configuration database is a file; it can be reloaded. The central manager therefore must have inherent capability to specify a file (to which it stored original configuration data). It can also specify "time information" (i.e., selecting Event Monitor under Tools menu. An event is time information. See lines 47-50 in column 23 for time field in an error event record) in order to retrieve information about the events for a given management set. See lines 51-57, column 29.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. **Claim 9-11 and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Axberg in view of DeKoning (Pub. No. 6,671,776).

With respect to **claim 9**, Axberg shows *method of a data storage system in which multiple computers those use information and multiple external storage systems those store information are connected to a network respectively and each of them is arranged separately* [See the above discussion of claim 1 and claim 5, in which the limitation was substantively discussed], comprising:

logging on to a management server to request access permission [See the discussion of claim 5, in which the limitation was discussed].

storing in a database by said management server, a change of said configuration information [In Axberg, any change in configuration data (due to changes in the configuration) would be reflected in the local storage of the central manager].

Axberg does not show, but DeKoning shows:

sending configuration information by said management server [A console is shown in Fig. 6. See lines 6-17 in column 5. As indicated, the console is just an UI to the server system, to which the management server transmits configuration information. See Fig. 6];

instructing said management server to change said configuration information [See Fig. 6. The graphical user interface shows the parameter entry for new configuration. This tells the management server to change the configuration information (after being sent from the console)];

issuing an exclusive control command by said management server to multiple external storage systems [See lines 26-32 in column 7. The host will send information to the controllers (part of the storage system) to reconfigure the SAN.];

receiving by said management server the completion of a setting of said configuration information from said external storage systems in response to the command [See lines 20-32, column 7. Any change is reflected in the controller for the storage, and they are read out (via the host) to the management console (as it is only a user interface)].

It would have been obvious to one of ordinary skill in the art at the time of the invention to use storage area network discovery method shown in Axberg in DeKoning, because DeKoning shows a system which utilizes a discovery method (See lines 34-38, column 5) yet does not show how such discovery method is implemented. Axberg illustrates a general concept of such discovery and as well as how one might perform the discovery.

With respect to **claim 10**, DeKoning shows *the method according to claim 9, wherein said configuration information that said management server handles includes*:

setting concerning an internal access path of an external storage system [See lines 16-29. column 8.],

a logical unit [See lines 16-29, column 8], capacity of the logical unit, an access authority to the logical unit, or data move;

setting concerning data copy between said external storage systems;

*setting or acquisition of performance control modes or performance data of said external storage systems; **or***

setting of a data storage system maintenance method, fault occurrence, fault notification, or user operation.

For the claim at hand, showing that one limitation, "a logical unit," reads on DeKoning is sufficient to show that the whole claim reads on DeKoning.

With respect to **claim 11**, Axberg shows *the control method of the data storage system according to claim 9, wherein an external storage system that is an object of a change of its configuration information is recognized and said exclusive control command is issued to only said external storage system* [LL_SetAttr in lines 40-58, column 17 has a specific target storage system to which it is issued].

With respect to **claim 19**, Axberg does not show, but DeKoning shows the *data storage system according to claim 18, wherein said management server part issues an exclusive control command to said multiple external storage systems when event information in said configuration information database is accumulated in point of time series.* The event information (e.g., user

input to the GUI) is "accumulated" (i.e., inputted to the central manager) and as a consequence, commands are issued to the storage controllers.

6. **Claim 23** is rejected under 35 U.S.C. 103(a) as being unpatentable over Axberg.

With regard to **claim 23**, Axberg does show events ("modification history") *the data storage system according to claim 21, wherein said management server comprises a function of displaying a modification history of a system configuration or a history of a system performance.* Error events, when requested by the central manager and eventually displayed at UI, are a "history of system performance."

7. **Claim 24** is rejected under 35 U. S. C. 103(a) as being unpatentable over Axberg in view of Chirashnya et al (Pat. No. US 6,598,179, Chirashnya hereinafter)

With regard to **claim 24**, Axberg does not shows *that said management server comprises a function that posts the time when the size of a file that an application of said computer uses reaches the capacity of a logical disk unit of said external storage system.* Ax berg shows that said management server comprises a function that posts time of error events (which shows the time of error event), but does not indicate that an error event will be generated when the file size reaches the capacity of the logical disk.

Chirashnya shows that in lines 19-20, column 12 that an error message should result when the file size reaches the capacity of the logical disk. (That is, when a file is full).

It would have been obvious to one of ordinary skill in the art at the time of the invention, to generate an error log message when a file size reaches the logical disk capacity, because as Chirashnya shows, such condition indicates a write error.

8. **Claim 16** is rejected under 35 U. S. C. 103(a) as being unpatentable over Axberg in view of "VERITAS Volume Manager 3.1 Migration Guide" (VERITAS hereinafter) .

With respect to **claim 16**, Axberg shows *a control method of a data storage system in which multiple computers that use information and multiple external storage systems those store information are connected to a network respectively, each of them is arranged separately* [See the above discussions of claims 1 and 5], and *the data storage system has a management server connected via a first network* [See above], comprising:

inquiring by a management server, to a computer of the size of a file that an application software of said computer uses [Axberg shows inquiring about a volume but does not show inquiring about a file or about using a file size as to search. VERITAS however, shows searching a file, together with its size as metadata.

It would have been obvious to one of ordinary skill in the art at the time of the invention to extend the storage system to handle files as well as the volumes, because it allows administrator to deal with high level, abstract file objects without having to keep track of information on which file are mounted on which volume groups. As shown by VERITAS, the details of handling file involves its metadata, including size.

receiving a response in point of time series [That an inquiry should be returned with a response is a given]; and

retrieving by said management server, association between a logical disk unit and said file that was stored in the unit from contents of a configuration information database, and indicating a relationship between the capacity of said logical disk unit and the size of said file in point of time series [Axberg shows a retrieval of information. VERITAS shows the specific information cited in the limitation ("association between a logical disk unit and said file"). See Fig. 4-3, in page 87 for allocated file size and the see Fig. 4-12 for the size of logical volume ('volume group')].

It would have been obvious to one of ordinary skill in the art at the time of the invention for Axberg to use additional parameters for examining the storage system as VERITAS shows (such as an association between a logical disk and file), because in order to allocate additional disk space for a file system, it helps to know how much disk space already has been allocated from a logical disk and to which file system.

9. **Claims 15 and 17** are rejected under 35 U. S. C. 103(a) as being unpatentable over Axberg and VERITAS, and further in view of Chirashnya.

With respect to **claim 15**, Axberg shows *a control method of a data storage system in which multiple computers that use information and multiple external storage systems that store information are connected to a network respectively, each of them is arranged separately* [See

the discussion of the above independent claims 1 and 5], *and the data storage system has a management server connected via a first network, comprising* [See the above discussion of claims 1 and 5]:

Axberg shows querying for information from the central manager, but does not show querying for information based on file type or time of its access. That is, Axberg does not show *inputting a file type and time that said multiple computers use, to said management server.*

VERITAS shows information including file type (See page 84 of VERITAS for Fig. 4-1 for vxFS) and Rikimoto shows access history (which includes the time of access).

It would have been obvious to one of ordinary skill in the art at the time of the invention to expand the metadata information about a logical volume, including file type and time of access (so that the volumes can be searched based on the file type and time of access), because an ability to search based on the file type and time provides for better storage security and for better integrity of the file system.

retrieving by said management server a configuration information database and displaying a physical storage position of a logical unit that corresponds to said file type [The preceding limitation involved file type. Given that file type was inputted through UI, the central manager would use the input to retrieve associated configuration information.];

retrieving another logical unit related to said physical storage position and displaying said another logical unit [This is limitation merely a repeats the preceding step to another volume or a file];

Rikimoto shows

retrieving data in which a modification history of said data storage system is accumulated [See Fig. 1 for 'history information,' which holds modification history)], and

displaying modified contents of said data storage system related to said storage position before said time [See Fig. 5 for displaying modified contents].

Axberg shows the retrieval of event logs and Chirashnya shows errors pertaining to file-system full error.

retrieving data in which a performance history of a logical unit is accumulated, and displaying a performance of a logical volume after said time [The logs contains error messages, and therefore, it indicates how well the file system functions without error, based on time]; and

Rikimoto shows *displaying or posting said modified contents of said system* based on time. Rikimoto does not show when that is displayed, however. Chirashnya shows that an error message is given when a file cannot grow larger; that is, *when the performance of said logical volume is degraded.*

It would have been obvious to one of ordinary skill in the art at the time of the invention to keep track of the number of error messages in the error logs and to view the content of the file

before and after the occurrence of the errors, because (1) the errors indicate that something must be done in order to prevent the system from waiting on I/O (2) knowing the states of the file before and after the errors help one to determine how much of the file should be rolled back (3) knowing the amount to rollback allows one to properly reallocate the file space for the storage system for the logical disks.

With respect to **claim 17**, Chirashnya shows *the control method of the data storage system according to claim 16, wherein said relationship* predicts, *displays or posts the time when said capacity of said logical disk unit and said file size become equal using the contents of said configuration information database.* See the rejection of claim 24, as it involves, at least in part, substantively the same limitation as that discussed for claim 24.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ji-Yong D. Chung whose telephone number is (571) 272-7988. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wiley can be reached on (571) 272-3923. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ji-Yong D. Chung
Patent Examiner
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